

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

	STREAM NAME Bed	r Butte 1	LOCATION Gilt Edge Mine Lead, SD				
	STATION #BB-14 R	IVERMILES	STREAM CLASS				
			RIVER BASIN				
	STORET #		AGENCY US EPA				
	INVESTIGATORS J.		3. Henry				
	FORM COMPLETED BY		ATE 9/10/07 REA IME 1:00 AM (PM)	ASON FOR SURVEY Biomonitoring			
	J. Slavick		MME 1:00 AM PM Habitat site investigation				
			······································				
	WEATHER CONDITIONS	Now .	hours	ere been a heavy rain in the last 7 days? No (light drizzle)			
		storm (heavy rain (steady r	rain) \square \square Yes	•			
,		showers (inte	rmittent)	emperature 70 ° C			
		clear/sunny	Other_				
			<u> </u>				
	SITE LOCATION AND	Draw a map of the site a	nd indicate the areas sampled (or	attach a photograph)			
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		•	500)				
ļ	STREAM CHARACTERIZATION	Stream Subsystem M Perennial	Stream	т Туре			
	CHARACIERIZATION		Cold	dwater 🔲 Warmwater			
		Stream Origin O Glacial O Non-glacial montane	Spring-fed Catche	neut Areakm²			
		Non-glacial montane Swamp and bog	☐ Other				
ļ	<u> </u>		·				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

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WATERSHED FEATURES	Predominant Surrounding Landuse Forest Commercial Field/Pasture Industrial Agricultural Residential Other Mine 5.to	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin Trees Shrubs	ant species present Grasses Herbaceous
INSTREAM FEATURES	Estimated Reach Length 100 m Estimated Stream Width 1.5 m Sampling Reach Area m² Area in km² (m²x1000) km² Estimated Stream Depth m Surface Velocity m/sec (at thalweg)	Conopy Cover Partly shaded Shaded High Water Mark m Proportion of Reach Represented by Stream Morphology Types Riffle % Run % Pool % Channelized Yes No Dam Present Yes No
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reac	Very little LWD
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Attached Algae Attached Algae dominant species present Present Present Rooted Submergent Roo	ON Flow dreds
WATER QUALITY	Temperature0 C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Witer Odors Whormal/None Sewage Chemical Chemical Chemical Stained Chemical Chemical
SEDIMENT/ SUBSTRATE	Offics Normal Sewage Petroleum Chemical Anaerobic None Offic	Deposits Studge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color?
	Moderate O Profuse	☐ Yes W No

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INOI	RGANIC SUBSTRATE ((should add up to 1			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)					
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area				
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)					
Boulder	> 256 mm (10")	10%		materials (CPOM)					
Cobble	64-256 mm (2.5"-10")	50%	Muck-Mud	black, very fine organic					
Gravel	2-64 mm (0.1"-2.5")	30%]	(FPOM)					
Sand	0.06-2mm (gritty)	10%	Marl	grey, shell fragments					
Silt	0.004-0.06 mm	0%]						
Clay	< 0.004 mm (slick)	0%]						

High gradient, mineral dominant, very little to none CPOM.

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME Bear Butte LOCATION Gilt Edg					lac	Mine L	ead		<u>5 }</u>	>									
STATION #BB-IARIVERMILE				STR	EAM	CLAS				<u> </u>									
LAT LONG				RJV	ER B.	ASIN													
STORET #							AGI	ENCY											
INVESTIGATORS	3											J	LOT	NUMBER					
FORM COMPLET	ED	BY					DA TIM	_	A)\	Л	PM		REA	SON FOR SURV	EY				
HABITAT TYPES		i Ca	obble	e	%							□ Sa	ınd_ _%		_%				
SAMPLE		Gear	use	d C	D-	frame 🗆	kic	k-net			Othe	r							
COLLECTION	F	low	wer	e th	ie sa	mples c	ollec	ted?	ب ت	vadi	ing			☐ from bank	ng 🖸	om ł	oat		
		1 Co	bble	e		iber of j incrophyt	Sna				Veg	etate		anks	□ Sa	and_ 		_	
GENERAL COMMENTS												·							
QUALITATIVE I Indicate estimated Periphyton Filamentous Algae					0 = 6	bsent/N	3)bser 4	ved, 1	Slir	nes				0	1 = 1 1 1	2	3	1 4 4 4
1					-	_	-	-							-				
FIELD OBSERVA Indicate estimated	Macrophytes 0 1 2 3 4 Fish 0 1 2 3 4 FIELD OBSERVATIONS OF MACROBENTHOS Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)																		
Porifera	0	1		3	4	Aniso			0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	l	2	3	4	Zygop			0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemip			0	1	2	3	4	Trichoptera	0	ì	2	3	4
Turbellaria	0	1	2	3	4	Coleo	otera		0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepido	pter	a	0	1	2	3	4						
Oligochaeta	0	l	2	3	4	Sialida	ie		0	I	2	3	4						
Isopoda	0	1	2	3	4	Coryd	alida	e	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulie	dae		0	1	2	3	4						
Decapoda	0	1	2	3	4	Empid	idae		0	1	2	3	4						
Gastropoda	0	Ţ	2	3	4	Simuli	idae		0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabini	dae		0	1	2	3	4						
						Culcid	ae		0	1	2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Bear Butte	LOCATION Gilt Edge Mine Lead, SD				
STATION #_BB-14 RIVERMILE	STREAM CLASS				
LAT LONG	RIVER BASIN				
STORET #	AGENCY U.S. EPA				
INVESTIGATORS J. Slavick, R. H	enry				
FORM COMPLETED BY J. Slavick	DATE 4/10/07 REASON FOR SURVEY				

	Habitat	T	Condition	1 Category	
	Parameter	Ontimal	1		Poor
	1. Epifaunal Substrate/ Available Cover	Optimal Greater than 50% of substrate favorable for epifaunal colonization and fish cover: mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	Suboptimal 30-50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	Marginal 10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 10% stable habitat; lack of habitat is obvious, substrate unstable or lacking.
each	SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling reach	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent: root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or and bottom, little of no root mat; no submerged vegetation	Hard-pan rlay or bedrook, no root mat or vogetation
≯ ¥	SCORE /	20 19 (18) 17 16	XS 14 13 12 11	10 9 8 1 6	5 4 3 2 1 0
ers to be eval	3. Pool Variability	Even mix of large- shallow, large-deep. small-shallow, small- deep pools present.	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools	Majority of pools small- shallow or pools absent.
m et	SCORE	20 19 18 17 16	15/14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment. 20-50% of the bottom affected, slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends, moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development: more than 80% of the bottom changing frequently, pools almost absent due to substantial sediment deposition
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel, or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradient Strams" Form

Pools not present mostly rittle/rmg

	Habitat		Condition	n Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present	Channelization may be extensive: embankments or shoring structures present on both banks: and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habital greatly altered or removed entirely.
	SCORE	20 19 18 (17/ 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
ipling reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length / to 2 times longer than if it was in a straight line.	Channel straight: waterway has been channelized for a long distance.
San	SCORE /	20 19/18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 1 0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable: evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
e eva	SCORE /D (LB)	Left Bank 102 9	8 7 6	5 4 3	2 1 0
to D	SCORE/D(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
Parameters	9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	76.90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE/D (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
ł	SCORE 2 (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawas, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
;	SCORE (LB)	Leff Bank 10 9	8 7 6	5 4 3	2 1 0
•	SOORE (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0

Total Score 176

See

attached

"High. Gradient

Streams" Form

> (Substituting 3) parameters from "High Gradient Streams" Form, as appropriate.)

BB

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Bear ButteCreek	LOCATION]
STATION # BB-14 RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	} '
STORET#	AGENCY	}
investigators *Collected dur	DATE 10-02-07 REASON FOR SURVEY Previously	1.
FORM COMPLETED BY	DATE 10-02-07 TIME AM PM REASON FOR SURVEY Previously Phase 1	during

ł	Habitat		Condition	Category	
1	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE				
n sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50- 75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
ted i	SCORE			10.50 John 1986	
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
ıram	SCORE				
. Pa	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE				
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riftle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE		ENERGY ELECTRON		

* = change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Habitat	Condition Category						
	Parameter	Optimal	Suboptimal	Marginal	Poor			
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.			
	SCORE	00 - 12 M8 m 12 16	315-414-5175-12-517	F102E91E98E17EF6	35.54.23.52.56.50			
ding reach	7. Frequency of RiMes (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water of shallow riffles; poor- habitat, distance between riffles divided by the width of the stream is a ratio of >25.			
amp	SCORE							
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE (LB) SCORE (RB)	Banks stable; evidence of crosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.			
	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented, disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.			
	SCORE(LB)	In the second						
	SCORE(RB)	STATE DEPOSITION OF THE PARTY O	1957年1965年1965年1965年1965年1965年1965年1965年1965					
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activitics have impacted zone only minimally	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone < meters: little or no riparian vegetation due to human activities.			
	SCORE(LB)				2000			
	1			The state of the s				

Total Score 55 (3 para meters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAME BEO	ar Butte LOCATION G: It Edge Mine Lead, SD	
STATION # BB-16 R		
LATL	ONG RIVER BASIN	
STORET#	AGENCY U.S. EPA	
INVESTIGATORS J	.Sldvick, R. Henry	
FORM COMPLETED BY	DATE 4100 AM FM REASON FOR SURVEY Site investigation	
<u>г</u>	TI	
WEATHER CONDITIONS	Now Past 24 Has there been a heavy rain in the last 7 days?	
	storm (heavy rain) U U Tes SNo	
	showers (intermittent)	
	% %cloud cover% Other	
SITE LOCATION AND	Draw a map of the site and indicate the areas sampled (or attach a photograph)	
MAP		
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	100	
•		
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	1 3 (長子) (133)	
	1,34/16// 3 1 1	
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2	Shows	
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plow	40 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
\mathcal{I}		
	 	
STREAM	Stream Subsystem Stream Type	
CHARACTERIZATION	Stream Subsystem Perennial Intermittent I Tidal Coldwater Warmwater	
	Stream Origin	
	Glacial Glacial Catchment Area km² Non-glacial montane Mixture of origins Swamp and bog Other	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

WATERSHED FEATURES	Prédominant Surrounding Landuse ☐ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin Trees dominant species present Confers	ant species present J Grasses Herbaceous
INSTREAM FEATURES	Estimated Reach Length 100 m Estimated Stream Width 2 m Sampling Reach Area m² Area in km² (m²x1000) km² Estimated Stream Depth m Surface Velocity m/sec (at thalweg)	Canopy Cover Partly open Partly shaded Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Riffle % Run % Pool% Channelized Pes No Dam Present Partly shaded Shaded
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ react	Several large snags barea) were noted
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Floating Algae Attached Algae	and species present Rooted floating Tree floating areas of slow non-turpulent
WATER QUALITY	Temperature° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Normal/None
SEDIMENT/ SUBSTRATE	Octors Normal Sewage Petroleum Chemical Anaerobic None	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes No

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INO	RGANIC SUBSTRATE ((should add up to 1		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)						
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area				
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)					
Boulder	> 256 mm (10")	15%		materials (CPOM)	·				
Cobble	64-256 mm (2.5"-10")	50%	Muck-Mud	black, very fine organic					
Gravel	2-64 mm (0.1"-2.5")	30%]	(FPOM)					
Sand-	0.06-2mm (gritty)	2.5%	Marl	grey, shell fragments	·				
Silt	0.004-0.06 mm	2.5%]						
Clay	< 0.004 mm (slick)	0]		•				

*See data sheet from BB-14

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME								LO	CAT	ION										
STATION #	RIV	ER	MIL	.E_				STR	(EAI	M CLAS	SS									
LAT	LO1	۱G					\prod	RIV	'ER I	BASIN										
STORET#								AG	ENC	Y										
INVESTIGATORS]	LOT	NUMBER					
FORM COMPLETI	ED I	BY					- 1	DA TIM		A	M	PM	- 1 '	REA	SON FOR SURVE	Y				
HABITAT TYPES		Co	bble	:			Sna	ags_		nabitat t %		Vege	etate		anks%	☐ Saı	nd_ _%		_%	
SAMPLE	G	ear	use	d C	D-f	rame	: O	kic	k-ne	i		Othe	т							
COLLECTION	н	ow	wer	e th	e sar	nple	s c	alleç	cted?	a	wad	ing			☐ from bank	☐ fro	m b	oat		
		l Co	bble	3	num i Ma			Sna	ags_	s taken		Veg	etate		anks	☐ Saı	nd_ -		-	
GENERAL COMMENTS																				
QUALITATIVE L Indicate estimated										rved, 1	= R	are,	2 =	= Co	mmon, 3= Abunda	ant, 4	= I	Oom	inaı	nt
Periphyton					0	1	2	3	4		Sli	mes				0	1	2	3	4
Filamentous Algae					0	1	2	3	4		Ma	croi	nvei	rtebr	ates	0	1	2	3	4
Macrophytes					0	1	2	3	4		Fis	h				0	1	2	3	4
FIELD OBSERVA Indicate estimated				:	0 = 4	Abse	nt/	Not	Obs						ganisms), 2 = Con 4 = Dominant (>5)	,
Porifera	0	1	2	3	4	Ani	isor	tera	1	0	ı	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4		-	tera		0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Her	nip	tera		0	1	2	3	4	Trichoptera	0	1	2	3	4

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	. 0	1	2	3	4	Other	0	ì	2	3	4
Hirudinea	0	l	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	ì	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	I	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	l	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	l	2	3	4						
Gastropoda	0	·ì	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Boar Butte	LOCATION	
STATION #88-16 RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY

	Habitat		Condition	a Category	
1	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover: mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat, well-suited for full colonization potential: adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 10% stable habitat: lack of habitat is obvious: substrate unstable or lacking.
rach	SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
d in sampling reach	1	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation composi-	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vogetation present.	All mud or cley or sand bottom: httle or no root man no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
1 and a second	SCORE /	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated	3. Pool Variability	Even mix of large- sharlow, large-deep, small-shallow, small- deep pools present.	Majority of pools large- deep, very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small- shallow or pools absent
mete	SCORE	20 19 18 17 16	15 14 13/12 11	10 /9 (8) 7 6/	5 4 3 2 1 0
Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment: 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars. 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development, more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
ļ	SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradient Streams" Form

· High gradient - prols w/ coarse substrate

Some vescular agn plants present in deep pool

at ds. side of read

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
pling reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these treas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight: waterway has been channelized for a long distance.
sam	SCORE /	20 19 18 17 (15)	15 14 13 12 11	10 9 8 6	3 2 1 0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Modera ely unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
e ev	SCORE $\frac{9}{2}$ (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 . 0
s to b	SCORE <u>9</u> (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
Parameter	9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream. Up stream	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE 10 (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE <u>[O</u> (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE ()(RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	_ _	/JLS			

Total Score 2015

See attached

Streams" Form

> (Substituting 3 parameters from "High Gradient Streams" Form, as appropriate)

89-16

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Bear Butte	LOCATION Gilt Edge Mine]
STATION # BB-16 RIVERMILE	STREAM CLASS] . /
LATLONG	RIVER BASIN] '
STORET#	AGENCY U.S. EPA]
INVESTIGATORS J. Slavick, C.A.	ogess, P. Churchill]
FORM COMPLETED BY	DATE 10-2-07 REASON FOR SURVEY Site	
J. Slavick	TIME 1:51 AM PM investigation biomonitoring P	ase 2

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	· Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE				
n sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
ted tr	SCORE	加护/建筑等		的多多数是是	
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
aran	SCORE				
ă.	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE				
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	20世纪代史史			

* - change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Alteration dredging absent or minimal; stream with normal pattern. present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present. SCORE Occurrence of niffles relatively frequent; ratio of distance between niffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelized and disrupted. SCORE Occurrence of niffles relatively frequent; ratio of distance between niffles divided by width of the stream is between 7 to 15. Occurrence of niffles divided by the width of the stream is between 15 to 25. Occurrence of niffles width of the stream is between 15 to 25.	Poor s shored with gabion ment; over 80% of ream reach relized and pted. Instream at greatly altered or ved entirely. Tally all flat water or own riffles; poor at; distance between s divided by the to of the stream is a of >25.
Alteration dredging absent or minimal; stream with normal pattern. SCORE Dresent, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present. Coccurrence of niffles relatively frequent; ratio of distance between niffles divided by width of the stream :1 (generally 5 to 7); variety of habitat is key. In streams where Alteration present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelized and disrupted. SCORE Occurrence of niffles relatively frequent; ratio of distance between niffles divided by width of the stream is between 7 to 15. Occurrence of niffles infrequent; distance between niffles divided by the width of the stream is between 15 to 25.</td <td>ment; over 80% of ream reach relized and pted. Instream at greatly altered or oved entirely. Tally all flat water or own riffles; poor at; distance between a divided by the of the stream is a</td>	ment; over 80% of ream reach relized and pted. Instream at greatly altered or oved entirely. Tally all flat water or own riffles; poor at; distance between a divided by the of the stream is a
7. Frequency of Riffles (or bends) Occurrence of niffles relatively frequent; ratio of distance between niffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where Occurrence of niffles infrequent; distance between riffles divided by bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25. Generatively frequent; ratio of the stream is between 15 to 25.	rally all flat water or ow riffles; poor at; distance between s divided by the of the stream is a
7. Frequency of Riffles (or bends) Riffles (or bends) relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where infrequent; distance between riffles divided by the width of the stream is between 7 to 15. bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25. shallo habitat inffles width of the stream is between 15 to 25.	ow riffles; poor at; distance between s divided by the of the stream is a
SCORE TO THE TOTAL TOTAL TO THE TOTAL TOTAL TO THE TOTAL TOTAL TOTAL TO THE TOTAL TOTA	
8. Bank Stability (score each bank) erosion or bank failure absent or minimal; little potential for future problems. <5% of bank in reach has areas of erosion. Note: determine left or right side by affected. 8. Bank Stability (score each bank) erosion mostly healed over. 5-30% of bank in reach has areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion potential during floods.	tble; many eroded ; "raw" areas ent along straight ons and bends; us bank sloughing; 10% of bank has onal scars.
vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. of plants is not well-patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. 5 cents of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	than 50% of the inbank surfaces ed by vegetation; otion of streambank ation is very high; ation has been wed to timeters or less in ge stubble height.
SCORE (LB)	0.
10. Riparian >18 meters; human activities (i.e., parking activities have impacted activities have acti	n of riparian zone <6 s: little or no an vegetation due to n activities.
SCORE (LB) Total Distriction (LB)	
SCORE (RB) Right Balleton Score (RB)	THE PROPERTY AND ADDRESS OF THE PARTY OF THE

Total Score 58 (3 parameters)

A-8

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAME Stra	wberry Creek	LOCATION GILL	Edge Mine Lead, SD
	IVERMILE	STREAM CLASS	<u> </u>
LATL	ONG	RIVER BASIN	
STORET#		AGENCY U.S.E	PA
INVESTIGATORS 3	Slavick, R	Henry	
FORM COMPLETED BY)	DATE 4/10/07 TIME 4:50 AM (REASON FOR SURVEY Biomonitoring Site investigation
WEATHER CONDITIONS	Now storm (head rain (stead showers (i %cloud co clear/sunn	y rain) ntermittent) over%	Has there been a heavy rain in the last 7 days? Yes Yoo Air Temperature C ° C Other
SITE LOCATION AND MAP	Draw a map of the si	te and indicate the areas sa	ampled (or attach a photograph)
	Flow	of the state of th	
STREAM CHARACTERIZATION	Stream Subsystem	mittent Tidal	Stream Type Coldwater
l	1		

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

	W	
WATERSHED FEATURES RIPARIAN VEGETATION	Protominant Surrounding Landuse Forest I Commercial Field/Pasture Industrial Other Residential Inducate the dominant type and record the domin	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy The process of the process o
(18 meter buffer)	dominant species present Confer 5	· · · · · · · · · · · · · · · · · · ·
INSTREAM FEATURES	Estimated Reach Length 100 m Estimated Stream Width 1.5 m Sampling Reach Aream² Area in km² (m²x1000)km² Estimated Stream Depth m Surface Velocitym/sec (at thalweg)	Canopy Cover Partly shaded Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Run% Prool% Channelized Yes No Dam Present Yes No
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reac	b area)
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Attached Algae Attached Algae Cot vascula dominant species present Filamentous	Rooted floating
WATER QUALITY	Temperature ° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Normal/None
SEDIMENT/ SUBSTRATE	Odors Sewage Petroleum Chemical Anaerobic None Other Sight Moderate Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes Mo

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INO	RGANIC SUBSTRATE ((should add up to 10		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)					
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area			
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	dra red			
Boulder	> 256 mm (10")	36%		materials (CPOM)	12.5%			
Cobble	64-256 mm (2.5"-10")	45%	Muck-Mud	black, very fine organic	2 (0)			
Gravel	2-64 mm (0.1"-2.5")	15%	<u></u>	(FPOM)	2.5%			
Sand	0.06-2mm (gritty)	7%	Marl	grey, shell fragments				
Silt	0.004-0.06 mm	3%]					
Clay	< 0.004 mm (slick)	0	1					

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME		LOCATION							
STATION#	RIVERMILE	STREAM CLASS							
LAT	LONG	RIVER BASIN							
STORET#		AGENCY							
INVESTIGATORS			LOT NUMBER						
FORM COMPLET	ED BY	DATE AM PM	REASON FOR SURV	ΈΥ					
HABITAT TYPES	Indicate the percentage ☐ Cobble % ☐ S ☐ Submerged Macrophy	e of each habitat type prese nags%	ent ated Banks% Other (☐ Sand%					
SAMPLE COLLECTION		collected?		☐ from boat ☐ Sand					
GENERAL COMMENTS									
	ISTING OF AQUATIC abundance: 0 ≈ Absent	BIOTA Not Observed, I = Rare, 2	2 = Common, 3= Abun	dant, 4 = Dominant					
Periphyton	0 1 2	2 3 4 Slimes		0 1 2 3 4					

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS
Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

					_									_			
Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	l	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	i	2	3	4	Lepidoptera	0	1	2	3	4						- }
Oligochaeta	0	l	2	3	4	Sialidae	0	1	2	3	4	:					
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						ļ
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						ı
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						ĺ
Bivalvia	0	1	2	3	4	Tabinidae	0	l	2	3	4						
						Culcidae	0	1	2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Strawberry Creek	LOCATION 6:1+ Edge	Mine Lead, SD
STATION #SC-\ RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE REAS	SON FOR SURVEY

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential: adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat, habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE	20 19 18 17 16	(15)14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Domestic of the state of the st	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common	Mixture of soft sand, mud of clay; mud may be dominant; some root mats and submerged vegetation present	All mud or oldy or sand bottope fittle or no root patt, no submerged vegetation.	Hard-pan cley or bedroek; no root mat or regetation.
	SCORE	20 19 18 17 16	13 14 13/12 11	10 9 8 7 6	5 4 3 2 1 0
1 0 0	3. Pool Variability	Even mix of large- shallow, large-deep, small-shallow, small- deep pools present	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small- shallow or pools absent.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 1 6	5 4 3/2 1 0
Cook of	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development: more than 80% of the bottom changing frequently, pools almost absent due to substantial sediment deposition.
	SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of • channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradient Streams" Form

Habitat Condition Category Parameter Optimal Suboptimal 6. Channel Channelization or Some channelization Channelization may be Banks shored with Alteration dredging absent or present usually in areas extensive; embankments gabion or cement; over of bridge abutments: or shoring structures minimal; stream with 80% of the stream reach present on both banks; normal pattern evidence of past channelized and channelization, i.e., and 40 to 80% of stream disrupted. Instream dredging, (greater than reach channelized and habitat greatly altered or past 20 yr) may be disrupted. removed entirely. present, but recent channelization is not present 18 17 (16) **SCORE** 20 19 15 14 13 12 11 10 4 3 2 7 Changel straight: The bends in the stream The bends in the stream The bends in the stream 7. Channel increase the stream increase the stream increase the stream waterway has been length 3 to 4 times longer length 1 to 2 times longer length 1 to 2 times longer channelized for a long Sinuosity than if it was in a straight than if it was in a straight than if it was in a straight distance. line. Note - channel brading is considered normal in coastal pains Parameters to be evaluated broader than sampling reach and other low-lying areas. This paramed not easily rated in the areas.) SCORE 20 19/18 17 16 13 12 11 Banks stable; evidence of Moderately stable; Moderately unstable; 30-Unstable; many eroded 8. Bank Stability erosion or bank failure infrequent, small areas of 60% of bank in reach has areas; "raw" areas areas of erosion, high erosion potential during (score each bank) absent or minimal: little erosion mostly healed frequent along straight potential for future over. 5-30% of bank in sections and bends: obvious bank sloughing; problems. <5% of bank reach has areas of floods. 60-100% of bank has affected. erosion. erosional scars SCORE (LB) Left Bank 8 0 10 9 6 5 3 2 1 SCORE (RB) Right Bank 6 10 9 8 6 5 4 3 0 More than 90% of the 70-90% of the 50-70% of the Less than 50% of the 9. Vegetative streambank surfaces and streambank surfaces streambank surfaces streambank surfaces Protection (score covered by native immediate riparian zone covered by vegetation; covered by vegetation; each bank) covered by native vegetation, but one class disruption obvious; disruption of streambank vegetation, including of plants is not wellpatches of bare soil or vegetation is very high; Note: determine left trees, understory shrubs, represented; disruption closely cropped vegetation has been or right side by or nonwoody evident but not affecting vegetation common; less removed to facing downstream macrophytes: vegetative full plant growth than one-half of the 5 centimeters or less in upstream disruption through potential to any great potential plant stubble average stubble height. grazing or mowing extent; more than oneheight remaining. minimal or not evident; half of the potential plant almost all plants allowed stubble height remaining. to grow naturally SCORE (LB) Left Bank 10 3 0 8 7 5 4 2 SCORE 5 (RB) (3) Right Bank 8 7 6 4 3 0 Width of riparian zone Width of riparian zone Width of riparian zone 6-Width of riparian zone 10. Riparian >18 meters; human 12-18 meters; human 12 meters; human <6 meters: little or no Vegetative Zone activities (i.e., parking activities have impacted activities have impacted riparian vegetation due to Width (score each lots, roadbeds, clear-cuts, zone only minimally, zone a great deal. human activities. bank riparian zone) lawns, or crops) have not impacted zone SCORE 10 (LB) (10)Left Bank 0 SCORE 5 (RB) 5 Right Bank 10

Total Score 156 146

(Substituting 3 parameters from "High Gradient Streams" Form, as appropriate.)

See attached "High Gradient Streams" Form

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HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAMNAME Strawberry Creek	LOCATION Gilt Edge Mine	
STATION # SC-1 RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	1
STORET#	AGENCY	
	ring Phase 2 to correct wrong form used	
FORM COMPLETED BY	DATE 10-02-07 REASON FOR SURVEY Previously d TIME AM PM Phase 1	uring

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
;	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat, lack of habitat is obvious; substrate unstable or lacking.
	SCORE			哈萨里斯克	
sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50- 75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
E E	SCORE				
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow- deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
aram	SCORE				
Pari	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 30 3 17 32			
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffic substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	20 E 10 E			

* = change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

j	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20, 20, 8, 12, 10			
ling reach	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat, distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat, distance between riffles divided by the width of the stream is a ratio of >25.
sampl	SCORE				
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE(LB) SCORE(RB)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional sears.
Parameters to	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE(LB) SCORE(RB)				
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE(LB)				
	SCORE(RB)				

Total Score 49 (3 parameters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAME Bed	1 Butte	LOCATION GIL	Edge Mine Lead, SD	
STATION#BB-3		STREAM CLASS	7	
LATL	ONG	RIVER BASIN		
STORET #		AGENCY U.S. E	PA	
INVESTIGATORS J.	Slavick, F	2. Henry		
FORM COMPLETED BY		DATE OVIOLOT TIME 5:50 AM (F	M REASON FOR SURVEY Sibe inve	<u>s</u> t
WEATHER CONDITIONS	Now storm (hea rain (stead showers (i	ly rain) Ontermittent)	Has there been a heavy rain in the last 7 days Yes WNo Air Temperature 55 ° C	 i?
	clear/sunn	у 🗓	Other	
SITE LOCATION AND MAP	Draw a map of the sit	te and indicate the areas san	mpled (or attach a photograph) Le o	\setminus
	A WA	Ro	ad	<u></u>
		Slow Flow	Grasses W	
	10000000000000000000000000000000000000	À	Gravel +	/
STREAM CHARACTERIZATION	Stream Subsystem	ermittent	Stream Type	
CHARACIERIZATION	Stream Origin Glacial Non-glacial montane Swamp and bog	□ Spring-fed	Coldwater Warmwater Catchment Area km²	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

WATERSHED FEATURES	Prédominant Surrounding Landuse Forest	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion Whone Moderate Heavy	
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin In Trees Shrubs dominant species present Confers bey	ant species present - Herbaceous Orasses - Herbaceous	is gravel bods
INSTREAM FEATURES	Estimated Reach Length	Canopy Cover Partly open Partly shaded Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Riffle % Run% Pool% Channelized Pes No Dam Present Partly shaded Shaded	4 trees
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reac	h area)	
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Attached Algae dominant species present Valuation		
WATER QUALITY	Temperature ° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Wormal/None	<u>-</u>
SEDIMENT/ SUBSTRATE	Offers Normal Chemical Other Oik WAbsent Slight Orderste	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color?	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INO	RGANIC SUBSTRATE (should add up to 1			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)				
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area			
Bedrock			Detritus	sticks, wood, coarse plant				
Boulder	> 256 mm (10")	2%] .	materials (CPOM)	·			
Cobble	64-256 mm (2.5"-10")	80%	Muck-Mud	black, very fine organic				
Gravel	2-64 mm (0.1"-2.5")	10%].	(FPOM)	_			
Sand	0.06-2mm (gritty)	5%	Marl	grey, shell fragments				
Silt	0.004-0.06 mm	3%]					
Clay	< 0.004 mm (slick)	0]					

*See previous BB-6 Notes

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

		1,00,000						
STREAM NAME		LOCATION						
STATION #	RIVERMILE	STREAM CLASS						
LAT	LONG	RIVER BASIN						
STORET#		AGENCY						
INVESTIGATORS		_	LOT NUMBER					
FORM COMPLET	ED BY	DATE AM PM	REASON FOR SURV	EY				
HABITAT TYPES		e of each habitat type prese nags% Ueget. ytes%		☐ Sand%				
SAMPLE COLLECTION	How were the samples Indicate the number of	f jabs/kicks taken in each ha Snags	☐ from bank	☐ from boat ☐ Sand				
GENERAL COMMENTS								
	ISTING OF AQUATIC abundance: 0 = Absent	BIOTA /Not Observed, 1 = Rare, 2	2 = Common, 3= Abuno	dant, 4 = Dominant				

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	j	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	I	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	i	2	3	4						
Oligochaeta	0	l	2	3	4	Sialidae	0	I	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	i	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME	LOCATION	
STATION # BB - 3 RIVERMILE	STREAM CLASS	
LAT LONG ·	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY

	Habitat		Condition	Category	
}	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks. cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential: adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat: habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious. substrate unstable or lacking.
each	SCORE	20 19 18 17 16	15 14 (13)12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling reach	2. Pool Substrate Characterization	Mixture of pubstrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, frud, or clay; mud may be dominant: some foot mats and submerged vegetation present.	All mud or clay or sand bottom, little of no root mat; no submerged vegetation.	Hard-par clay or bedreck; no root root or regetation.
uatec	SCORE	20 19 18 17 16	18 14 13 12 11	10) 9 8 7 6	5 4 3 2 1 0
ers to be eval	3. Pool Variability	Even paix of large- shallow, large-deep, small-shallow, small- deep pools present.	Majority of pools large deep; very few spallow.	Shallow pools much more provalent than deep pools.	Majority of pools small- shallow or pools absent.
	SCORE	20 19 18 17 16	15/14/13/12/11/	10 9 8 7 6	(5) 4 3 2/1 0
Par	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 19 18 17 16	15 14 13 (13)11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel: or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or rifile substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
_	SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradient Streams" Form

	Habitat		Condition	Category			
ł	Parameter	Optimal	Suboptimal	Marginal	Poor		
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.		
	SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
pling reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream tength 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.		
Sam	SCORE /	20 19 18 17 16	15/14 13 12 11 /	10 (9) 8 (7 6	5 3 2 1 0		
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable, evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable: many eroded areas: "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has		
e eva	SCORE⊈(LB)	Left Bank 10 9	(8) 7 6	5 4 3	erosional scars.		
s to b	SCORE (RB)	Right Bank 10 9	8 7 (6)	5 4 3	p 1 0		
Parameters	9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream Upstream,	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; les than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0		
	SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0		
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.		
	SCORE (LB)	Left Bank 10	8 7 6	5 4 3	2 1 0		
	SCORE (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0		

Total Score 1965137

(Substituting 3 parameters from "High Gradient Streams" Form, as appropriate.)

See attached "High Gradient Streams" Form

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Bear Butte	LOCATION Gilt Edge Mine]
STATION # BB 3 RIVERMILE	STREAM CLASS] . /
LATLONG	RIVER BASIN	\
STORET#	AGENCY .	
INVESTIGATORS J. Slavick]
FORM COMPLETED BY J. Slavick	DATE 10-2-07 TIME 10:57 AD PM REASON FOR SURVEY * Complete	ters
	required a not collecte	d in Sept

Π	V. 1		Condition Category							
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor					
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
	SCORE									
1 sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
<u>8</u>	SCORE	TO THE STATE OF THE								
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow- deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).					
I E	SCORE	可是 15 能够								
Pa	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
	SCORE									
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.					
	SCORE	20年12年18年17年16								

* - change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Habitat	Condition Category							
	Parameter	Optimal	Suboptimal	Marginal	Poor				
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.				
İ	SCORE	20 219 218 20 7 316	到5年4岁392月2岁1年	200 90 86 7 76	5 4 2 6 6				
ling reach	7. Frequency of Rifles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.				
amp	SCORE	10-00 18-10 E/C		10202 2022 202					
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE(LB) SCORE(RB)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.				
Parameters	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.				
	SCORE(LB)	to grow naturally.							
	SCORE(RB)								
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.				
	SCORE(LB)	5-40×55 10-1×1	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$						
l '	SCORE(RB)								

Total Score 41 (3 parameters)



PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAME BOOK	mer Gulch	LOCATION C	SILE	dge Mine	Lead, SD
_ ^41	VERMILE	STREAM CLAS		3	,
LATLO	ONG	RIVER BASIN			
STORET#		AGENCY U.	S. EP	A	
INVESTIGATORS ゴ. 🤇	lavick, R. 1	Henry			
FORM COMPLETED BY J. Slavick		DATE 4/11/07 TIME 4:45	AM PM	REASON FOR S	URVEYBiomonitoring estigation
WEATHER CONDITIONS	Now storm (hes	avy rain)	hours	Has there been a h	eavy rain in the last 7 days?

WEATHER CONDITIONS	Now Past 24 hours Yes No Yes You No Air Temperature Clear/sunny Other
SITE LOCATION AND MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph)
STREAM CHARACTERIZATION	Stream Subsystem Perennial Intermittent I Tidal Stream Origin Glacial Spring-fed Catchment Area km² Non-glacial montane Mixture of origins Swamp and bog Other

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

	r	
WATERSHED FEATURES	Predominant Surrounding Landuse George Commercial Field/Pasture Industrial Agricultural Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion Mone Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin Trees dominant species present Confer dec	
INSTREAM FEATURES	Estimated Reach Length 100 m Estimated Stream Width 1.5 m Sampling Reach Area m² Area in km² (m²x1000) km² Estimated Stream Depth m Surface Velocity m/sec (at thalweg)	Canopy Cover Partly open Partly shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Riffle % Run% Pool% Channelized Pes No Dam Present Partly shaded M Shaded
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reach	Significant amounts of harea) fallentree matter & CPOM
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Floating Algae Attached Algae dominant species present Frosted Surf Portion of the reach with aquatic vegetation	and species present Rooted floating ace mosses a alot of obligate terrestrial species
WATER QUALITY	Temperature° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Wormal/None Sewage Chemical Chemical Chemical Sightly turbid Turbid Chemical Chem
SEDIMENT/ SUBSTRATE	Odors Normal Sewage Petroleum Chemical Anaerobic None Ods Absent Slight Moderate Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes No

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Boomer Gulch	LOCATION				
STATION # BG- RIVERMILE	STREAM CLASS				
LATLONG	RIVER BASIN				
STORET#	AGENCY				
INVESTIGATORS					
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY			

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).		10-30% mix of stable habitat, habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
each	SCORE	20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling reach	2. Pool Substrate Characterization	Mixture of substrate materials with gravel and firm sand prevalent; root mass and submerged vegetation compon.	Mixture of soft sand, paid, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock no root mat or vegetation.
uatec	SCORE	20 (19) 18 17 16	15 14 13 12 1	10 9 8 7 6	5 4 3 2 1 0
rs to be eval	3. Pool Variability	Even mix of large- shallow, large-deep, small-shallow, small deep pools presept.	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small- shallow or pools absent
mete	SCORE /	20 (19) 18 17 16	15 14 13 12 1	10 9 8 7 6	5 4 3 2 1 0
Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradient Streams" Form

	Habitat Parameter		г		n Category	y				
		Optimal		ptimal		1argin:			Poor	
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some chann present, usua of bridge ab evidence of channelization dredging, (g past 20 yr) n present, but channelization	ally in areas utments; past on, i.e., reater than nay be recent	Channeli extensive or shorin present o and 40 to reach cha disrupted	e; emba g struct on both 80% o annelize	nkments ures banks; f stream	Banks sh gabion of 80% of the channelized disrupted habitat gremoved	r cement ne strear sed and l. Instre reatly al	t; over n reach am tered or
	SCORE	20 19 18 17 16		13 12 11	10 9	8	7 6	5 4	3 2	1 0
ing reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. Mote - channel braiding is considered formal in coastal plains and other low-lying areas. This parameter is not easily rated in hese				the stre to 2 tim	am es longer	Channel waterway channeliz	has be	en
sampl	SCORE	areas.) 20 19 18 17 (16)	15/14	13 12 11	10 9	8	7/6	5 4	3 2	1 0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately infrequent, s erosion most over. 5-30% reach has are erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.			Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.			
e eva	score <u>10</u> (lb)	Left Bank 10 9	8	7 6	5	4	3	2	1	0
to b	SCORE \Q (RB)	Right Bank (10) 9	8	7 6	5	4	3	2	1	0
Parameters	9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream. up Stream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.		surfaces native out one class not well- disruption not affecting owth any great	50-70% c streambar covered the disruption patches of closely creeds vegetation than one- potential height res	nk surfa by vege n obvio of bare s ropped n comn half of plant st	tation; us; soil or non; less the tubble	Less than streamba covered to disruption vegetation removed 5 centime average s	nk surfa by veget n of stre n is very n has be to eters or l	ces ation; ambank high; een
1	SCORE (LB)	Left Bank (10) 9	8	7 6	5	4	3	2	1	0
	SCORE (RB)	Right Bank (10) 9	8	7 6	5	4	3	2	1	0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters, human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of rips 12-18 meters activities have zone only mi	s; human ve impacted	Width of 12 meters activities zone a gr	s; huma have ir	n npacted	Width of <6 meter riparian v human ac	s. little o regetatio	or no on due to
	SCORE (LB)	Left Bank 10 9	8	7 6	5	4	3	2	1	0
	SCORE (RB)	Right Bank (10) 9	8	7 6	5	4	3	2	ı	0

Total Score 196

(Substituting 3 parameters from "High Gradient Streams" Form, as appropriate.)

See attached "High Gradient Streams" Form

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

•										
	STREAM NAME		LOC	ATION						
	STATION #	RIVERMILE	STREAM CLASS							
	LAT	LONG	RIVER BASIN							
	STORET#		AGENCY							
	INVESTIGATORS				LOT NUMBER	,				
	FORM COMPLETI	ED BY	DAT TI <u>M</u> I		REASON FOR	SURVEY				
	HABITAT TYPES	Indicate the percentag Cobble % © S Submerged Macroph	Snags	% 🗀 Ve	resent getated Banks9 Other (% □ Sa	and _%	%		
Macros	SAMPLE COLLECTION	Gear used D-frame How were the samples Indicate the number o Cobble Submerged Macroph	collect f jabs/l □ Snag	ted?		nk 🗖 fro	om bo			
Macros de contract de sentract to contract	GENERAL COMMENTS									
ton	Indicate estimated	JSTING OF AQUATIC abundance: 0 = Absent	l/Not O	bserved, 1 = Rar		Abundant,	4 = D			
	Periphyton	-	2 3		-	0	1	2 3	4	
	Filamentous Algae	0 1	2 3	4 Macr	oinvertebrates	0	1	2 3	4	
	1,.					_				

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	l	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	l	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	i	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	ï	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
L						Culcidae	0	1	2	3	4						

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INO	RGANIC SUBSTRATE (should add up to 19		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)					
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area			
Bedrock		20%	Detritus	sticks, wood, coarse plant materials (CPOM)	90%			
Boulder	> 256 mm (10")	45%		materials (CPOM)				
Cobble	64-256 mm (2.5"-10")	20%	Muck-Mud	black, very fine organic	1 . 0/			
Gravel	2-64 mm (0.1"-2.5")	10%]	(FPOM)	10%			
Sand	0.06-2mm (gritty)	3%	Marl	grey, shell fragments				
Silt	0.004-0.06 mm	2%]		0			
Clay	< 0.004 mm (slick)	0						



HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Boomer Gulch	LOCATION GILT Edge Mine]
STATION # BG- RIVERMILE	STREAM CLASS .	. /
LATLONG	RIVER BASIN	,
STORET#	AGENCY US EPA]
INVESTIGATORS J. Slavick, C. P.	rogess, P.Churchill	
FORM COMPLETED BY	DATE 10-2-07 REASON FOR SURVEY Biomonitoring	
J.Slavick	- I Mase & collectived - barran	eter
	not recorded in sept.duri	ng Phase 1

	Habitat	Condition Category										
	Parameter	Optimal	Suboptimal	Marginal	Poor							
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.							
	SCORE											
ı sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.							
fed ir	SCORE			en de de la co								
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).							
IL BE	SCORE											
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.							
	SCORE											
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.							
	SCORE											

* = change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Habitat		Condition	ı Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 - 19 - 218 - 314 - 162	568-14-5108-12-510	E10240: 1876: 7 = 6	25 5 4 23 5 10 4 ELLOX
ng reach	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat, distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat, distance between riffles divided by the width of the stream is a ratio of >25.
	SCORE				
85 ⊑					Samuela (mari da lum et ar a de
Farameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30- 60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional sears.
to be ev	SCORE(LB) SCORE(RB)	Definition (Company)			
Farameters	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented, disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE (LB) SCORE (RB)				
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE (LB)				
	SCORE(RB)	Right Balleton (1997)			

Total Score 57 (3 parameters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAME ST	raw berry Gee	K LOCATION Gilt Edge Mine
STATION # SC-5	RIVERMILE	_ STREAM CLASS
LAT	LONG	RIVER BASIN
STORET #		AGENCY U.S. EPA
INVESTIGATORS	Slavick,	R. Henry
FORM COMPLETED B		DATE 9/13/07 REASON FOR SURVEY Biomonitor ng site investigation
WEATHER CONDITIONS	Now	Past 24 Has there been a heavy rain in the last 7 days?

WEATHER CONDITIONS	Now Past 24 Has there been a heavy rain in the last 7 days? hours Yes No
SITE LOCATION AND MAP	Booke Gulob Rock Forested Rodd
STREAM CHARACTERIZATION	Stream Subsystem Perennial Intermittent Tidal Stream Origin Glacial Spring-fed Catchment Area km² Swamp and bog Other



PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

WATERSHED FEATURES RIPARIAN VEGETATION	Predominant Surrounding Landuse	Local Watershed NPS Pollution Who evidence Some potential sources Obvious sources Local Watershed Erosion Moderate Heavy The process of the
(18 meter buffer)	dominant species present Centers	some mixed deciduous
INSTREAM FEATURES	Estimated Reach Length (00 m Estimated Stream Width 1.5 m Sampling Reach Area m² Area in km² (m²x1000) km² Estimated Stream Depth m Surface Velocity m/sec (at thalweg)	Canopy Cover Partly shaded Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Run% Channelized Yes No Dam Present Yes No
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reac	harea) other CroM present
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Rooted Algae Attached Algae dominant species present None Portion of the reach with aquatic vegetation	Rooted floating Free floating
WATER QUALITY	Temperature ° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Normal/None Petroleum Fishy Water Surface Oils Slick Sheen Whone Other Tyrbidity (if not measured) Clear Slightly turbid Opaque Stained Other
SEDIMENT/ SUBSTRATE	Ofors Normal Sewage Petroleum Chemical Anaerobic None Other Offs Absent Slight Moderate Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes No

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INO	RGANIC SUBSTRATE ((should add up to 1		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)				
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area		
Bedrock		15%	Detritus	sticks, wood, coarse plant materials (CPOM)			
Boulder	> 256 mm (10")	40%	Ī	materials (CPOM)			
Cobble	64-256 mm (2.5"-10")	25%	Muck-Mud	black, very fine organic	Δ		
Gravel	2-64 mm (0.1"-2.5")	15%	}	(FPOM)	$\mathcal{O}_{\mathbb{R}^{n}}$		
Sand	0.06-2mm (gritty)	2.5%	Marl	grey, shell fragments			
Silt	0.004-0.06 mm	2,5%	}		0		
Clay	< 0.004 mm (slick)	0			<u> </u>		

Thin biofilm coating all the rocks; brown in color of slick.

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

•	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		CKO	ши	EKI.	EDRATE	FIE	المالات	DATA SID	er i				
	STREAM NAME			LO	CATIO	N								
	STATION #	RIVERMILE_		STI	REAM	CLASS								
•	LAT	LONG		RIV	ER BA	SIN								
	STORET #			AG	ENCY									
·	INVESTIGATORS						I	_OT	NUMBER					
	FORM COMPLET	ED BY		DA TIN		AM PN		REA	SON FOR SURV	EY ——			•	
	HABITAT TYPES	Indicate the polycome Cobble □ Submerged	_% 🚨	Snags_	ach ha %	Veg		d Ba	nks%	□ Sa	and_ _%		_%	
•	SAMPLE COLLECTION	Gear used 🔲				☐ Oth			☐ from bank	☐ fro	om t	ooat	,	
Macros		Indicate the no Cobble Submerged	umber (of jabs		taken in each	habi	itat (type. anks	□ Sa			-	
Macros collected collected to sentractor to contractor	GENERAL COMMENTS													
to TD.	QUALITATIVE L Indicate estimated					ed, 1 = Rare	, 2=	· Co	mmon, 3= Abun	dant, '	4 = I	Dom	inaı	nt
(nv)	Periphyton	· · · · · · · · · · · · · · · · · · ·	0 1	2 3	4	Slimes				0	1	2	3	4
70	Filamentous Algae		0 1	2 3	4	Масто	inver	tebra	ates	0	1	2	3	4
	Macrophytes		0 1	2 3	4	Fish				0	1	2	3	4
·	FIELD OBSERVA Indicate estimated	abundance: 0	= Abse	nt/Not	Obser				ganisms), 2 = Co 4 = Dominant ()	
	Porifera	0 1 2 3	4 Ani	soptera	1	0 1 2	3	4	Chironomidae	0	1	2	3	4

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	
Turbellaria	0	1	2	3	4	Coleoptera	0	I	2	3	4	Other	0	1	2	3	
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	l	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	I	2	3	4	Tabinidae	0	l	2	3	4						
						Culcidae	0	l	2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Strawberry Creek	LOCATION	
STATION #SC-5 RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover: mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential: adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat, habitat availability less than desirable: substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious, substrate unstable or lacking
each	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling reach	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and fight sand prevalent; root mats and submerged vegetation common.	Mustare of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat, no submerged vegetation.	Hard-pan clay or bedrock no root mat or vegetation.
usted	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
rs to be eval	3. Pool Variability	Even mix of large- shallow, large-deep, small-shallow, small deep pools present.	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small- shallow or pools absent.
mete	SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 3 2 1 0
Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment: 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars, 50-80% of the bottom affected, sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development: more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 19 18 17 16	15 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed	Very little water in channel and mostly present as standing pools
	SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradient Streams" Form

> Thindeposit of fine textured sediment coating rock surfaces

	[· · · · · · · · · · · · · · · · · · ·			
	Habitat Parameter	<u></u>		Category	1
		Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 (18)17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
pling reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
sam	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7/6	5 4 3 2 1 0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of crosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
) e e	SCORE $\frac{9}{2}$ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
s to t	SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
Parameter	9. Vegetative Protection (score each bank) Note: determine left or right side by facing demostration. upstream	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
ł	SCORE 10 (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
1	SCORE <u>9</u> (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE <u>IO</u> (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

(Substituting 3 parameters from "High Gradient Streams" Form, as appropriate.)

See attached "High Gradient Streams" Form

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Strawberry Creek	LOCATION GIL Edge Mine
STATION # SC-5 RIVERMILE	STREAM CLASS .
LATLONG	RIVER BASIN
STORET#	AGENCY
INVESTIGATORS J. Slavick, C.P.	rogess, P.Churchill
FORM COMPLETED BY J. Slavick	DATE 10-2-07 TIME 3:15 AM FM biomonitoring - collecting

3 parameter not recorded in Phosel of sampling in Sept

	Habitat		Condition	Category	
ŀ	Parameter_	Optimal	Suboptimal	Marginal	Poor
	Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE				
n sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
ted in	SCORE		的技术的基本主		
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow- deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	SCORE	阿里斯斯 亞羅 蘇			
i i	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	O P. N. W. W.		30 of 127 of	
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riftle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
<u> </u>	SCORE	图	L'ALLES COL		

* - change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20是10至18率分割使	515 E14 519 E12 E16	10 91 84 7 6	35.423524.0
ing reach	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water of shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
amp	SCORE				
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream SCORE(LB)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
5 6	SCORE(RB)				
Farameter	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented, disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE(LB)				
	SCORE (RB)	Wild of the state	Width of single	WEAR OF THE PROPERTY OF THE PR	W. M. C.
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-culs, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters, human activities have impacted zone a great deal.	Width of riparian zone of meters: little or no riparian vegetation due to human activities.
	SCORE(LB)				
	SCORE(RB)				

Total Score 49 (3 parameters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAMESTIA	wherry Creek LOCATION Gilt Edge Mine
STATION # SC-2 F	
LATL	ONG RIVER BASIN
STORET #	AGENCY U.S. EPA
INVESTIGATORS J	
FORM COMPLETED BY J. Slavick	DATE 9/13/07 PM REASON FOR SURVEY Biomonitoring Fine 10:30 PM For site investigation
WEATHER CONDITIONS	Now Past 24 Has there been a heavy rain in the last 7 days? Storm (heavy rain) Yes No rain (steady rain) Air Temperature 58 ° C % % % C % Other Other
SITE LOCATION AND MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph)
	Run Si-20
	Road Forested 7
STREAM CHARACTERIZATION	Stream Subsystem M Perennial Intermittent Tidal Stream Origin Glacial Official Mixture of origins Swamp and bog Stream Type Coldwater Warmwater Catchment Area km²

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

	· · · · · · · · · · · · · · · · · · ·		,
WATERSHED FEATURES	Predominant Surrounding Landuse George Commercial Field/Pasture Industrial Agricultural Residential	Leal Watershed NPS Pollution ☐ No evidence ☐ Some potential sources ☐ Obvious sources ☐ Heavy ☐ Heavy	
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin Trees Shrubs dominant species present Mixed Conif	Innispecies present Herbaceous	
INSTREAM FEATURES	Estimated Reach Length OO m Estimated Stream Width 1.5 m Sampling Reach Area	Canopy Cover Partly shaded Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Run% Pool% Run% Channelized Yes No Dam Present Yes No	
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reach	Significant tree barea) Mutter fallen in various	stretches of stream
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Floating Algae dominant species present Portion of the reach with aquatic vegetation	☐ Rooted floating ☐ Free floating	Channel.
WATER QUALITY	Temperature0 C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Normal/None Petroleum Chemical Chem	
SEDIMENT/ SUBSTRATE	Offors Normal Sewage Petroleum Chemical Anaerobic None Other Oths Absent Slight Moderate Profuse	Deposits Sawdust Paper fiber Sand Cother Looking at stones which are not deeply embedded, are the undersides black in color? Yes No	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INOI	RGANIC SUBSTRATE ((should add up to 1		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)								
Substrate Diameter Type		Diameter % Composition in Sampling Reach		Characteristic	% Composition in Sampling Area						
Bedrock		10%	Detritus	sticks, wood, coarse plant	Limited but cre matter present in form of trees	unic					
Boulder	> 256 mm (10")	40%		materials (CPOM)	in form of trees	(full 2					
Cobble	64-256 mm (2.5"-10")	30%	Muck-Mud	black, very fine organic)						
Gravel	2-64 mm (0.1"-2.5")	16%]	(FPOM)							
Sand	0.06-2mm (gritty)	2%	Marl	grey, shell fragments							
Silt	0.004-0.06 mm	2%]								
Clay	< 0.004 mm (slick)	0									

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

		· · · · · · · · · · · · · · · · · · ·	
HABITAT TYPES	Indicate the percentage ☐ Cobble% ☐ S ☐ Submerged Macrophy		nt ated Banks%
FORM COMPLETI	ED BY	DATE TI <u>ME</u> AM PM	REASON FOR SURVEY
INVESTIGATORS			LOT NUMBER
STORET #		AGENCY	
LAT	LONG	RIVER BASIN	
STATION #	RIVERMILE	STREAM CLASS	
STREAM NAME		LOCATION	

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(0)	, /e.	be	/
X	ν, ·	40	
Sev	7-C	y t	٥Υ
yor Cov	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\)·,	
Sor	ン	-	

COLLECTION	How were the samples collected?	\square wading	☐ from bank	☐ from boat	
	Indicate the number of jabs/kicks t ☐ Cobble ☐ Snags ☐ Submerged Macrophytes	aken in each habit Q Vegetated Q Oth	l Banks	☐ Sand)	
GENERAL COMMENTS					

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	ı	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	l	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

											_						
Porifera	0	ì	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	i	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	ì	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	i	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	·l	2	3	4	Simuliidae	0	l	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	i	2	3	4						
						Culcidae	0	1	2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Strawberry Creek	LOCATION	
STATION # SC-Q RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	
STORET #	AGENCY'	
INVESTIGATORS		
FORM COMPLETED BY	DATE AM PM REASON FOR SU	RVEY

ſ		Habitat		Condition	Category					
1		Parameter	Optimal	Suboptimal	Marginal	Poor				
		1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover: mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential: adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat, habitat habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious, substrate unstable or lacking.				
1	each	SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0				
	Parameters to be evaluated in sampling reach	2. Pool Substrate Characterization	Mixture of substrate materials, with grave and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft-sand, mud, or cley, mud may be dominant, some root mats and submerged vegetation present.	All mud of clay or sand bottom, little or no root mat; no submerged vegetation	Hard-pan clay or bedrock; no oot mat or vegetation.				
1	uated	SCORE	20 19 18 (17) 16	15 14 /3 12 11	× 9 8 7/6	5 4 3 2 1 0				
	rs to be eval	3. Pool Variability	Even parx of large- sharlow, large-deep, small-shallow, small- deep pools present.	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools	Majority of pools small- shallow or pools absent.				
4	mete	SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0				
	Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected: slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.				
l		SCORE	20 19 18 17 16	15 14 13 12 11	(19) 9 8 7 6	5 4 3 2 1 0				
		5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools				
		SCORE	20 19 (18)17 16	15 14 13 12 1	10 9 8 7 6	5 4 3 2 1 0				
_										

See attached "High Gradient Streams" Form

> Not crosion; a Significant pecipitation PPT (yellow-boy") slimy-like material

	Habitat		Condition	Category	
	Parameter				
1	4.5	Optimal	Suboptimal	Marginal	Poor
	6. Chaunel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present, usually in areas of bridge abutments: evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not	Channelization may be extensive: embankments or shoring structures present on both banks: and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement, over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line (Note - channel braiding is considered normal in coastal plans	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight, waterway has been channelized for a long distance.
sampling reach	SCORE J	and other low-lying areas. This parameter is not easily rated in these areas. 20 9 18 17 (16)	15 14 13 /2 11	10 9/8 7 6	5 4 3 2 1 0
1 5		Banks stable; evidence of	Moderately stable;	Moderately unstable: 30-	Unstable, many eroded
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	60% of bank in reach has areas of erosion, high erosion potential during floods.	areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has crosional scars.
EV8	SCORE (LB)	Left Bank 10 (9)	8 7 6	5 4	2 1 0
함	SCORE 9 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
Parameters	9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream. Upstvector.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes, vegetative disruption through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height
	SCORE (C)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters, human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE (O (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
L					

Total Score 167

See attached

"High Gradient

Streams Form

> (Substituting 3 parameters from "High Gradient Streams" Form, as appropriate.)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

LOCATION GILT Edge Mine
_ STREAM CLASS
_ RIVER BASIN .
AGENCY U.S. EPA
rogess, P. Churchill
DATE 10-02-07 TIME 5:03 AM (M) B: omonitoring; collecting 3

_	<u> </u>				ise 1:n Sept.
1	Habitat Parameter	Optimal	Suboptimal Suboptimal	Category Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE				
sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50- 75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
Eg E.	SCORE				
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
aram	SCORE				* 10 10 10
e e	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE				
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	亚洲 斯市 6			

bedrock
Iron precip
Coating all
rocks in
stream where
water flowing
or used to
flow during
high flow

* - change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Habitat		Condition	Сатедогу	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	900000000000000000000000000000000000000	5K-12-10-10	00 9 0 8 8 7 8 6	354 352 6 0
ing reach	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water of shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
ampl	SCORE				
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE (LB) SCORE (RB)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Parameter	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE(LB)				
	SCORE(RB)				
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone < meters: little or no riparian vegetation due to human activities.
	SCORE (LB)				
	SCORE(RB)				

Total Score 47 (3 parameters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAME Str	aw berry Creek	LOCATION GIT	Edgelline
STATION # 5C-3	RIVERMILE	STREAM CLASS	-
LATI	ONG	RIVER BASIN	
STORET#		AGENCY U.S. E	PA
INVESTIGATORS J.	Slavick, R.I	Henry	
FORM COMPLETED BY	,	DATE 9-13-07 TIME 11:25 W	REASON FOR SURVEY Biomenitoring for site investigation
WEATHER CONDITIONS	Now Storm (head rain (stead		Has there been a heavy rain in the last 7 days? Yes No Air Temperature 58°C
	%cloud co	ver %	Other
SITE LOCATION AND MAP	Draw a map of the si	e and indicate the areas sa	mpled (or attach a photograph)
STDFAM		A da	Flow Run Sc-3 *See note Forested contegorization Contegorization
STREAM CHARACTERIZATION		rmittent 🗋 Tidal	Stream Type Stroldwater
	Stream Origin Glacial Non-glacial montane Swamp and bog	© 6pring-fed Mixture of origins Other	Catchment Areakm²

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

WATERSHED FEATURES	Predominant Surrounding Landuse Forest Commercial Field/Pasture Industrial Agricultural Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin Trees dominant species present Mixed Cov	nant species present Herbaceous
INSTREAM FEATURES	Estimated Reach Length m Estimated Stream Width m Sampling Reach Area m² Area in km² (m²x1000) km² Estimated Stream Depth m Surface Velocity m/sec (at thalweg)	Canopy Cover Partly shaded Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Run% Channelized Yes No Dam Present Yes No
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ react	Some fallen tree barea) Matter in stream
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Attached Algae dominant species present Nove	☐ Rooted floating ☐ Free floating
WATER QUALITY	Temperature° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Normal/None
SEDIMENT/ SUBSTRATE	Ofors Sewage Petroleum Chemical Anaerobic None Other Oth Absent Slight Moderate Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Orange precipitate Coating Youks Looking at stones which are not deeply embedded, are the undersides black in color? Yes No

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

: INO	RGANIC SUBSTRATE (should add up to 1	COMPONENTS 100%)	ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)					
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area			
Bedrock		10%	Detritus	sticks, wood, coarse plant materials (CPOM)	some fullen trees			
Boulder	> 256 mm (10")	JUSU 0% 35%		materials (CPOM)	or grasses in strea			
Cobble	64-256 mm (2.5"-10")	30%	Muck-Mud	black, very fine organic	0			
Gravel	2-64 mm (0.1"-2.5")	JUS 25% 15%		(FPOM)				
Sand	0.06-2mm (gritty)	3%	Marl	grey, shell fragments				
Silt	0.004-0.06 mm	2%]					
Clay	< 0.004 mm (slick)	J4 8 5%	<u> </u>					

Pool had 8" layer fine textured material overlying very hard Substrate

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

DI	ENTRIC MACK	OII	4 ¥ 2	EKIE	MAILI	IELD DATA SIL	EE I					
STREAM NAME			LOCATION									
STATION #	RIVERMILE		STREAM CLASS									
LAT	LONG		RIVER BASIN									
STORET#			AGENCY									
INVESTIGATORS	·					LOT NUMBER						
FORM COMPLET	1	DA TIM	TE	AM PM	REASON FOR SURV	ÆΥ						
HABITAT TYPES	Indicate the percen □ Cobble% □ Submerged Macro	🖵 Šna	ıgs	%	□ Veget	nt ated Banks% Other (□ s:)	and_ _%		_%		
SAMPLE COLLECTION	Gear used D-frame kick-net D Other							-				
GENERAL COMMENTS												
	ISTING OF AQUAT abundance: 0 = Abs				1 = Rare, 2	2 = Common, 3= Abui	ndant,	4 =]	Dom	inant	t	
Periphyton	0 1	1 2	3	4	Slimes		0	ì	2	3	4	
Filamentous Algae	0 1	1 2	3	4	Macroin	vertebrates	0	1	2	3	4	
Macrophytes	0 1	1 2	3	4	Fish		0	1	2	3	4	
FIELD OBSERVA Indicate estimated		sent/	Not	Observed		(1-3 organisms), 2 = C lisms), 4 = Dominant ()		

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	l	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	ì	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	l	2	3	4	Sialidae	0	i	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	ì	2	3	4						

Macros Collected Sentor to contractor for ID.

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Strawberry CVK	LOCATION	
STATION # <u>SC-3</u> RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY

	Habitat		Condition	a Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential: adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat, habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
each	SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling reach	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common	Mixture of soft sand, prud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom: little or no root mat; no submerged vegetation.	Hard-pen clay or bearlock; no root mat or vegetation.
uatec	SCORE /	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
rs to be eval	3. Pool Variability	Even mix of large- shallow, large-deep, small-shallow, small- deep pools present	Majority of pools large deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small- shallow or pools absent.
Hete	SCORE	20 19 18 17 16	15 14/13 12 11	+0 9 8 7 6	5 4 2 2 1 0
Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars, 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development, more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 4	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools
	SCORE	20 19 (18)17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradient Streams" Form

Appears to be fine textured flow sis flow (fine-textured clay-like, sticky material) in deposition lenvironments, at fine coating over bodders or coloble

•	1	Habitat		Condition	Category	<u> </u>
		Parameter	Optimal	Suboptimal	Marginal	Poor
		6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present	Channelization may be extensive: embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement: over 80% of the stream reach channelized and disrupted Instream habitat greatly altered or removed entirely.
		SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
See attached "High Siradient Streams" Form	ing reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight: waterway has been channelized for a long distance.
torm (mes	SCORE	20 19 18 17 (16)	15 1# 13 12 11	10 9 8 7 6	5 4 3/2 1 0
egetation	be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable: evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
re thing	و دي	SCORE (Q(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
coniterio		SCORE S (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
nstapeurs es apeurs es betating	Parameters to	9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes, vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well- represented; disruption evident but not affecting full plant growth potential to any great extent; more than one- half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
		score Clb)	Left Bank 10 9	8 7 6 (8) 7 6	5 4 3	2 1 0
	/	10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE (CLB)	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	5 4 3 Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	2 1 0 Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	J	SCORE (LB) SCORE (RB)	Left Bank (10) 9 Right Bank 10 9	8 7 6 8 (7) 6	5 4 3	2 1 0
·	Ž		rugni dank 10 9	8 (7) 6	3 - 4 - 3	2 1 0

Condition Category

Habitat

Total Score 161 (Substituting 3 parameters from "High Gradient Streams" Form, as appropriate)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAMNAME Strawberry Crk.	LOCATION GILL Edge Mine	
STATION # 5C-3 RIVERMILE	STREAM CLASS	. /
LATLONG	RIVER BASIN	!
STORET#	AGENCY	
	ring Phose 2 to correct wrong form used	
FORM COMPLETED BY	DATE 10-03-07 REASON FOR SURVEY Previously	during
	TIME AM PM Phase 1	

	Habitat		Condition	Category	
	Parameter Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE				
n sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
ted in	SCORE				
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
Tan I	SCORE				
Å	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment, 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 41 41 45		Eller et al.	
:	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	建一种"车" 的			

* = change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	TV. Like 4	Condition Category				
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor	
ing reach	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abuments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.	
	SCORE .	20.10218910216	365 FEET 18 12 - 16	70 9, 78 7 6	35, 43, 44 of 10.	
	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.	
amp	SCORE			1040278747562		
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE(LB) SCORE(RB)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional sears.	
	9. Vegetative Protection (score each bank) SCORE (LB)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent, more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.	
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
	SCORE(LB)					
1	SCORE(RB)	30的部分中国	HAX XXX IN SECOND			

Total Score 48 (3 parameters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

LOCATION Gilt Edge Mine

LAT L	ONG	RIVER BASIN						
STORET #	0110	AGENCY U.S. EPA	•					
investigators J								
FORM COMPLETED BY	(DATE 9-13-07 TIME 18:53 AM PM for 5the investigation						
WEATHER CONDITIONS	Now storm (hea rain (stead showers (i clear/sunn	ly rain) Intermittent) Air Temperature 60 ° C over						
SITE LOCATION AND MAP	Draw a map of the si	map of the site and indicate the areas sampled (or attach a photograph)						
		Road						
	Tore to a	Forest of Grass es Grass es Pool Run extraction of the steel of the st	Significant orange of yellow flow coatti these layer of bedrock					
STREAM CHARACTERIZATION	Sifeam Subsystem	Stream Type ermittent						

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

	<u> </u>	
WATERSHED FEATURES	Prédominant Surrounding Landuse M Forest	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer) INSTREAM FEATURES	Logicate the dominant type and record the dominant species present	Canopy Cover Partly shaded Shaded High Water Mark m Proportion of Reach Represented by Stream Morphology Types Riffle % Run % Pool % Channelized Yes No
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reac	Limited trees fallen barea) in stream
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Roating Algae Attached Algae dominant species present Few grasses	a mosses
WATER QUALITY	Temperature° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Writer Odors Normal/None
SEDIMENT/ SUBSTRATE	Sewage Petroleum Chemical Anaerobic None Other Absent Slight Moderate Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes No
	* Fine textured -	floc (orange in color

*Fine textured floc (orange in color of similar to "yellow-boy") coating the rocks w/ depositional areas accumulating build-up

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

V	INOI	RGANIC SUBSTRATE (ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			
	Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	
80%	Bedrock		60% JLS	Detritus	sticks, wood, coarse plant materials (CPOM)	Limited faller	
10%	Boulder	> 256 mm (10")	20%		materials (CPOM)	tree matter	
5%	Cobble	64-256 mm (2.5"-10")	5%	Muck-Mud	black, very fine organic	0	
4%	Gravel	2-64 mm (0.1"-2.5")	JU25765%		(FPOM)		
1%	Sand	0.06-2mm (gritty)	JL3 0 1 2.5%	Marl	grey, shell fragments		
0%	Silt	0.004-0.06 mm	2/5%			0	
0%	Clay	< 0.004 mm (slick)	5%\				

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	_	LOCATION	
STATION# RIV	ERMILE	STREAM CLASS	
LAT LON	IG	RIVER BASIN	
STORET #		AGENCY	
INVESTIGATORS			LOT NUMBER
FORM COMPLETED I	BY	DATE AM PM	REASON FOR SURVEY

HABITAT TYPES	Indicate the percentage of each habitat type present □ Cobble % □ Snags % □ Vegetated Banks % □ Sand % □ Submerged Macrophytes % □ Other () _ %
SAMPLE COLLECTION	Gear used □ D-frame □ kick-net □ Other
	How were the samples collected? □ wading □ from bank □ from boat
	Indicate the number of jabs/kicks taken in each habitat type. Cobble Snags Vegetated Banks Sand Submerged Macrophytes Other ()
GENERAL COMMENTS	

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3 = Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	ì	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	ì	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	ì	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	I	2	3	4	Tabinidae	0	1	2	3	4						
<u></u>						Culcidae	0	1	2	3	4						

Macros
collected

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Strauberry Crk.	LOCATION	
STATION # SC-55 RIVERMILE	STREAM CLASS	
LATLONG	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY

*Extremely stable substrate due to exposed bedrock

See attached "High Gradient Streams" Form

	Habitat		Condition	n Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
each	SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling reach	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm and prevalent; root mats and submerged vegetation common.	Mixture of soft sand, and, or clay; mud may be dominant; some foot mats and submerged vegetation present.	All mud or clay or sand bottom; little of no root mat; no submerged vegetation.	Hard-pan elay or bedrack; no root mat or vegetation.
uate	SCORE /	20 19 18 17 16	15/14/13/12/11	10 9 8 7 6	5 4 3 2 1 0
ers to be eval	3. Pool Variability	Even mix of large- shallow, large-deep, small-shallow, small- deep pools present.	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small- shallow or pools absent
met	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
npling reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
San	SCORE /	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2/1 0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
e e	SCORE (D)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
to b	SCORE 9 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
Parameters	9. Vegetative Protection (score each bank) Note: determine left or right side by facing dewnstream. Upstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes, vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE <u>10</u> (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE <u>9</u> (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e, parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE <u> (</u> (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE <u>K</u> (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

Total Score 177

(Substituting 3 parameters
from "High Gradient Streams"
Form, as appropriate)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Strawberry Creek	LOCATION G.A. Edge Mine
STATION #5C-5.5 RIVERMILE	STREAM CLASS
LATLONG	RIVER BASIN
STORET#	AGENCY I.S. EPA
INVESTIGATORS J. Slavick, C. Pro	gess, P. Churchill
FORM COMPLETED BY J. Slavick	DATÉ 10-3-07 TIME 10:03 AM PM biomonitoring; collection

of 3 parameters not recorded during

Phase 1

Marginal Poor Sept. '07.

	Habitat		Condition	Category		(- 1 '07	
	Parameter	Optimal	Suboptimal	Marginal	Poor	Sept. '07.	_
	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.	<i>B</i>	
	SCORE						
Parameters to be evaluated in sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50- 75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.	* Iron pred coating all rock surfo mostly bed	p (ce
fed	SCORE		亚斯利斯			mostly bedi	rocl
eters to be evalua	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by I velocity/ depth regime (usually slow-deep).		
IT E	SCORE		Year James				
ર્ધ	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.		
	SCORE						
:	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.		
	SCORE					-	

* - change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

1 1	Habitat Parameter 6. Channel	Optimal	Condition Suboptimal		
	6. Channel		Supopuliai	Marginal	Poor
	Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE ·	20220218218216	到15年的第10年 (3至10年	20 9 7 8 7 7 6	252422 BEAG
	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of nifiles infrequent; distance between nifiles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
ampl	SCORE				
be evaluated broad	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream SCORE(LB) SCORE(RB)	Banks stable; evidence of erosion or bank failure absent or minimal, little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Parameter	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
1 1	SCORE(LB) SCORE(RB)				
1	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal. ::	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
1 1	SCORE(LB) SCORE(RB)				

Total Score 51 (3 parameters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAMESTY	auberry Creek	LOCATION GITE	dge Mine
STATION #SC-3.5 R	UVERMILE	STREAM CLASS	
LATL	ONG	RIVER BASIN	
STORET#		AGENCY U.S. E	PA
INVESTIGATORS J.	Slavick, R	Henry	
FORM COMPLETED BY	k	DATE 9-13-07 TIME 3:05 AM (F	M for site investigation
WEATHER CONDITIONS	Now storm (head rain (stead showers (i	ly rain)	Has there been a heavy rain in the last 7 days? Yes No Air Temperature 54°C
	clear/sunn		Other
SITE LOCATION AND MAP	Draw a map of the si	Forested	
		Rod Ended	Forles Ped Prows
		A A	
		foreste	
STREAM CHARACTERIZATION	Stream Subsystem OPerennial Inte	ermittent 🖸 Tidal	Stream Type
		- , , , , , ,	☐ Coldwater ☐ Warmwater
	Stream Origin Glacial Non-glacial montane Swamp and bog	Spring-fed Mixture of origins Other	Catchment Areakm²

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

	· · · · · · · · · · · · · · · · · · ·	
WATERSHED FEATURES	Predominant Surrounding Landuse ☐ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Other ☐ Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion Whone Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin I Trees dominant species present Mixed CONIC	
INSTREAM FEATURES	Estimated Reach Length 100 m Estimated Stream Width 1.5 m Sampling Reach Aream² Area in km² (m²x1000)km² Estimated Stream Depth m Surface Velocitym/sec (at thalweg)	Canopy Cover Partly shaded Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Run% Riffle Rool% Channelized Pes No Dam Present Per No
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ reac	Some fallen trees barea) though not many
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Attached Algae Attached Algae dominant species present Attached Portion of the reach with aquatic vegetation	# terrestrial regetation ses growing inear a within stream bank
WATER QUALITY	Temperature° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Sewage Petroleum Chemical Fishy Other Water Surface Oils Slick Slick Sheen Other Tyrbidity (if not measured) Clear Slightly turbid Opaque Opaque Stained Other
SEDIMENT/ SUBSTRATE	Octors Sewage Petroleum Chemical Anaerobic None Other Oits Absent Slight Moderate Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INOI	RGANIC SUBSTRATE ((should add up to 1			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)					
						Characteristic	% Composition in Sampling Area		
Bedrock		10%	Detritus	sticks, wood, coarse plant	Some presence				
Boulder	> 256 mm (10")	3 5%		materials (CPOM)	Some presence of CPOH, mostly s	ticks+gr			
Cobble	64-256 mm (2.5"-10")	35%	Muck-Mud	black, very fine organic					
Gravel	2-64 mm (0.1"-2.5")	25%		(FPOM)	0	:			
Sand	0.06-2mm (gritty)	2%	Marl	grey, shell fragments	_				
Silt	0.004-0.06 mm	3%]						
Clay	< 0.004 mm (slick)	0]		<u> </u>				

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	LOCATION					
STATION # RIVERMILE	STREAM CLASS					
LAT LONG	RIVER BASIN	RIVER BASIN				
STORET #	AGENCY					
INVESTIGATORS		LOT NUMBER				
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY				
	12					

HABITAT TYPES	Indicate the percentage of each habitat type present □ Cobble% □ Snags% □ Vegetated Banks% □ Sand% □ Submerged Macrophytes% □ Other ()%
SAMPLE COLLECTION	Gear used □ D-frame □ kick-net □ Other
	How were the samples collected? □ wading □ from bank □ from boat
	Indicate the number of jahs/kicks taken in each habitat type. □ Cobble □ Snags □ Vegetated Banks □ Sand □
	Submerged Macrophytes Other ()
GENERAL COMMENTS	

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3 = Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	l	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	l	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	I	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	i	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	l	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	ı	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						i
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	l	2	3	4						
Gastropoda	0	.1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						Ì
						Culcidae	0	1	2	3	4						

Macros collected desert to contractor contractor

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Strawberry Creek	LOCATION					
STATION # <u>5C-3.</u> 5 RIVERMILE	STREAM CLASS					
LATLONG	RIVER BASIN	RIVER BASIN				
STORET #	AGENCY					
INVESTIGATORS						
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY				

	Habitat		Condition	ı Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover. mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat, well-suited for full colonization potential: adequate habitat for maintenance of populations: presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking
reach	SCORE	20 19 (18)17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling r	2. Pool Substrate Characterization	Mixture of aubstrate materials, with gravel and firm sand prevalent; root prats and submerged vegetation common.	Mixiure of soft sand, mud, or clay; mud may be dominant, some root mats and submerged vegetation present.	All mud or clay or sand bottom, little or no root mat, no submerged vegetation	Hard-pan clay or bedrock, no root mat or vegetation
uate	SCORE	20 (19) 18 17 16	15 14 13 12 11	10 -9 8 7 8	5 4 3 2 1 0
rs to be eval	3. Pool Variability	Evep mix of large- shallow, large-deep, small-shallow, small- deep pools present.	Majority of pools large- deep, very few shallow.	Shallow pools much more prevalent than deep pools	Majority of pools small- shadlow or pools absort.
in et	SCORE	26 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars. 50-80% of the bottom affected: sediment deposits at obstructions, constrictions, and bends: moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools
	SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

represtivat vegetation growing in stream of closely along margins, creating good creating good habitat diversity

attached "High Gradient Streams"

	Habitat		Condition	Category			
	Parameter	Optimal	Suboptimal	Marginal	Poor		
	6. Channel Alteration	Channelization or dredging absent or minimal, stream with normal pattern.	Some channelization present usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present	Channelization may be extensive: embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement: over 80% of the stream reach channelized and disrupted Instream habitat greatly altered or removed entirely.		
	SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0		
pling reach	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length, to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight: waterway has been channelized for a long distance		
Sam	SCORE	20 19 (18) 17 16	15 14 13 12/11	10 9 8 7 6	5 4 3 2 1 0		
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank)	Banks stable: evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.		
e eva	SCORE (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0		
3	SCORE $\frac{17}{7}$ (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0		
Parameter	9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream. Upstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident, almost all plants allowed to grow naturally	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented: disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.		
- 1	SCORE (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0		
ļ	SCORE $\sqrt{2}$ (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0		
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.		
	SCORE (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0		
	SCORE <u>()</u> (RB)	Right Bank 10 9	8 7 (6)	5 e ^{tt} 4 3	2 1 0		

Total Score 179

See

attached

"High. Gradient

Streams' Form

> (Substituting 3 parameters from "High Gradient Streams" Form, as appropriate)

BB-14 BB-16 5C-3 BG-1 5C-2 S:-3

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Strawberry Crk	LOCATION GILL Ed	lge Mine
STATION # SC-3.5 RIVERMILE	STREAM CLASS	
LAT LONG	RIVER BASIN	
STORET#	AGENCY U.S. EP	Α
INVESTIGATORS J. Slavick, C.	Progess, P.Chur	ch.
FORM COMPLETED BY J. Slavick	DATE 10-3-07 TIME 11:45 AM PM	REASON FOR SURVEY Phase 2 biomonitoring; eallecting

3 parameters not recorded in Sept.

	Habitat		Condition	Category	
ı	Parameter	Optimal	Suboptimal	Marginal	Poor
	Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE				
n sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of nichespace.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
fed iv	SCORE				
Parameters to be evaluated in sampling reach	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	SCORE				
ă	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE				
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE				

* - change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Γ	Walifad		Condition	Category	
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
-	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	50 × 10 × 18 × 14 × 16	\$15 EM \$13 E 12 E 10 E	10 20 20 81 22 6	55423302606
ling reach	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
samp	SCORE	New de la constant de			
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE(LB) SCORE(RB)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of crosion; high crosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
Parameters (9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE(LB)				
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE(LB)				
	SCORE(RB)	ExtBugganker) Assessed			

Total Score 56 (3 parameters)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 1)

STREAM NAME Stra	wberry Creek	LOCATION GILT E	dae Mine
STATION #SC-4 F		STREAM CLASS	
LATL	ONG	RIVER BASIN	
STORET#		AGENCY U.S. E	PA
INVESTIGATORS	T. Slavick, R		
FORM COMPLETED BY		DATE 4-13-07 TIME 4:11 AM PM	reason for survey Biomonitoring for site investigation
WEATHER CONDITIONS	Now storm (hear rain (stead showers (in the showers of the showers of the showers clear/sunn showers of the sh	dy rain)	Has there been a heavy rain in the last 7 days? O Yes SNo Air Temperature 55 ° C Other
SITE LOCATION AND MAP	Draw a map of the sit	te and indicate the areas sam	pled (or attach a photograph)
СТРБАМ	To Edward	Coo	Run Flow Culv
STREAM CHARACTERIZATION	Stream Subsystem Perennial Inte	ermittent 🚨 Tidal	Stream Type Coldwater
	Stream Origin Glacial Non-glacial montant Swamp and bog	Spring-fed Mixture of origins Other	Catchment Areakm²

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 2)

WATERSHED FEATURES	Prédominant Surrounding Landuse ☐ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Other ☐ Residential	Local Watershed NPS Pollution No evidence Some potential sources Local Watershed Erosion Whone Moderate Heavy Local Watershed Erosion Whone Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dor Trees Shrubs dominant species present Mixed Comi	Herbaccous Fer Adeciduous, Some grasses along banks
INSTREAM FEATURES	Estimated Reach Length 100 m Estimated Stream Width 1 m Sampling Reach Area m² Area in km² (m²x1000) km² Estimated Stream Depth m Surface Velocity (at thalweg)	Canopy Cover Partly open Partly shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types Riffle % Run % Pool% Channelized Yes No Dam Present Yes No
LARGE WOODY DEBRIS	LWDm² Density of LWDm²/km² (LWD/ re	None each area)
AQUATIC VEGETATION	☐ Floating Algae ☐ Attached Algae	minant species present It layers rock + stream bottom ** **terrestrial plants encroach stream Water Odors Normal None Sewage
WATER QUALITY	Temperature° C Specific Conductance Dissolved Oxygen pH Turbidity WQ Instrument Used	Water Odors Normal/None
SEDIMENT/ SUBSTRATE	Offors W Normal Chemical Other Offs M Absent Sewage None None Offs M Absent Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes Mo

slick greenish layer of algae layer thin over thin brown mat

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (Pg. 3)

INO	RGANIC SUBSTRATE (should add up to 1			ORGANIC SUBSTRATE COMPONENT (does not necessarily add up to 100%)					
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area				
Bedrock		10%	Detritus	sticks, wood, coarse plant materials (CPOM)	Some sticks +				
Boulder	> 256 mm (10")	20% sk		materials (CPOM)	grass matter				
Cobble	64-256 mm (2.5"-10")	515407650%	Muck-Mud	black, very fine organic	Sick algae				
Gravel	2-64 mm (0.1"-2.5")	22%	}	(FPOM)	layer				
Sand	0.06-2mm (gritty)	3%	Mari	grey, shell fragments					
Silt	0.004-0.06 mm	2.5%]						
Clay	< 0.004 mm (slick)	2.5%]						

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	LOCATION	
STATION # RIVERMILE	STREAM CLASS	
LAT LONG	RIVER BASIN	
STORET#	AGENCY'	
INVESTIGATORS		LOT NUMBER
FORM COMPLETED BY	DATE TIME AM PM	REASON FOR SURVEY

HABITAT TYPES	Indicate the percentage of each habitat type present ☐ Cobble % ☐ Snags % ☐ Vegetated Banks % ☐ Sand % ☐ Submerged Macrophytes % ☐ Other () %
SAMPLE COLLECTION	Gear used ☐ D-frame ☐ kick-net ☐ Other
	How were the samples collected? □ wading □ from bank □ from boat
	Indicate the number of jahs/kicks taken in each habitat type. □ Cobble □ Snags □ Vegetated Banks □ Sand □ Submerged Macrophytes □ Other ()
GENERAL COMMENTS	

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	l	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	- 4	Coleoptera	0	1	2	3	4	Other	0	ì	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4	•					
Isopoda	0	1	2	3	4	Cory dalidae	0	ì	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	I	2	3	4						
Gastropoda	0	ŀ	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

Macros
collected
collected
sent to
contractor
contractor

HABITAT ASSESSMENT FIELD DATA SHEET - LOW GRADIENT STREAMS

STREAM NAME Strawberry Creek	LOCATION
STATION # 5C-4 RIVERMILE	STREAM CLASS
LATLONG	RIVER BASIN
STORET #	AGENCY
INVESTIGATORS	······································
FORM COMPLETED BY	DATE REASON FOR SURVEY

ſ		Habitat .		Condition	Category	
		Parameter	Optimal	Suboptimal	Marginal	Poor
		1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	reach	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
	Parameters to be evaluated in sampling r	2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent root mats and submerged vegetation common.	Mixture of soft sand mud, or clay; padd may be dominant; some root mats and submerged yagetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	hard-pan clay or bedrock; no foot mat or vegetation.
	nate	SCORE	20 19 18 17 16	15 14 13 12 11	10 /9 (8) 7 /8	5 4 2 2 1 0
	rs to be eval	3. Pool Variability	Even flix of large- sharlow, large-dcop, small-shallow, small- deep pools present.	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools	Majority of pools small- shallow or pools absent
	mete	SCORE	20 19 18 17 16	15 14 13 12 11	کار 9 8 7 9 و کار	5 4 (3) 2 1 0
	Para	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
		SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
		5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
		SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

See attached "High Gradieut Streams" Form

Habitat Condition Category Parameter Poor Optimal Suboptimal Marginal Channelization or Some channelization Channelization may be 6. Channel Banks shored with Alteration dredging absent or present, usually in areas extensive: embankments gabion or cement; over or shoring structures of bridge abutments: 80% of the stream reach minimal, stream with normal pattern. evidence of past present on both banks; channelized and and 40 to 80% of stream channelization, i e., disrupted. Instream dredging, (greater than reach channelized and habitat greatly altered or past 20 yr) may be disrupted. removed entirely. present, but recent channelization is not present 20 19 18 17 16 15 14 13 (12)1 **SCORE** 4 3 10 2 1 The bends in the stream The bends in the stream The bends in the stream, Channel straight: 7. Channel increase the stream increase the stream increase the stream waterway has been length 1 to 2 times longer Sinuosity length 3 to 4 times longer length 1 10 2 times longer channelized for a long than if it was in a straight than if it was in a straight than I'll was in a straight distance. line. (Note - channel braiding is considered normal in coastal plains Parameters to be evaluated broader than sampling reach and other low-lying areas. This parameter is not easily rated in these areas.) 18 17 16 کار 20 13 (12)11 **SCORE** 15/14 9 10 Banks stable; evidence of Moderately stable; Moderately unstable; 30-Unstable; many eroded 8. Bank Stability erosion or bank failure infrequent, small areas of 60% of bank in reach has areas; "raw" areas (score each bank) absent or minimal; little erosion mostly healed areas of erosion; high frequent along straight potential for future over. 5-30% of bank in erosion potential during sections and bends; problems. <5% of bank reach has areas of obvious bank sloughing; floods. affected. 60-100% of hank has erosion. erosional scars SCORE ___(LB) Left Bank 10 9 1 SCORE 3 (RB) 3 9 Ŕ 7 0 Right Bank 10 6 More than 90% of the 70-90% of the 50-70% of the Less than 50% of the 9. Vegetative streambank surfaces and streambank surfaces streambank surfaces streambank surfaces Protection (score immediate riparian zone covered by native covered by vegetation; covered by vegetation; each bank) covered by native vegetation, but one class disruption obvious; disruption of streambank patches of bare soil or vegetation, including of plants is not wellvegetation is very high; Note: determine left trees, understory shrubs, represented; disruption closely cropped vegetation has been or right side by or nonwoody evident but not affecting vegetation common: less removed to facing downstra macrophytes, vegetative full plant growth than one-half of the 5 centimeters or less in disruption through potential to any great potential plant stubble average stubble height. upstream. grazing or mowing extent, more than oneheight remaining. minimal or not evident. half of the potential plant almost all plants allowed stubble height remaining. to grow naturally. SCORE 1 (LB) Left Bank 10 9 5 0 SCORE 4 (RB) Right Bank 10 6 5 4 3 O Width of riparian zone Width of riparian zone 6-Width of riparian zone Width of riparian zone 10. Riparian >18 meters; human 12-18 meters: human 12 meters; human <6 meters, little or no Vegetative Zone Width (score each activities (i.e., parking activities have impacted activities have impacted riparian vegetation due to lots, roadbeds, clear-cuts, zone only minimally. zone a great deal. human activities. bank riparian zone) lawns, or crops) have not impacted zone. SCORE <u>L</u>(LB) Left Bank 10 9 2 0 SCORE 3 (RB) (3 Right Bank 10 0

Total Score 76

(Substituting 3 parameters of "High Gradient Streams" Form, as appropriate)

See attached "High Gradient Streams" Form

3 parameters not recorded du

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Strawberry Creek	LOCATION Gilt Edge Mine
STATION # SC-4 RIVERMILE	STREAM CLASS .
LATLONG	RIVER BASIN
STORET#	AGENCY U.S. EPA
INVESTIGATORS J. Slavick, C.P.	rogess, P.Churchill
FORM COMPLETED BY	DATE 10-3-07 REASON FOR SURVEY Phase 2
J. Slavick	TIME 1:01 M EM biomonitoring collecting

Condition Category Habitat Parameter Optimal Suboptimal Marginal Poor Greater than 70% of 20-40% mix of stable Less than 20% stable 40-70% mix of stable substrate favorable for habitat; well-suited for habitat; habitat habitat; lack of habitat is 1. Epifaunal Substrate/ epifaunal colonization and full colonization potential; availability less than obvious; substrate Available Cover fish cover; mix of snags, adequate habitat for desirable; substrate unstable or lacking. submerged logs, undercut maintenance of frequently disturbed or banks, cobble or other populations; presence of removed. stable habitat and at stage additional substrate in the to allow full colonization form of newfall, but not potential (i.e., logs/snags yet prepared for that are not new fall and colonization (may rate at not transient). high end of scale). SCORE *Gray, organic matter precipitate coating all Gravel, cobble, and Gravel, cobble, and Gravel, cobble, and GraveL cobble, and 2. Embeddedness boulder particles are 0boulder particles are 25boulder particles are 50boulder particles are more 25% surrounded by fine 75% surrounded by fine than 75% surrounded by 50% surrounded by fine sediment. Layering of fine sediment. sediment. sediment. cobble provides diversity of niche space. SCORE evaluated All four velocity/depth Only 2 of the 4 habitat Dominated by 1 velocity/ Only 3 of the 4 regimes 3. Velocity/Depth regimes present (slowregimes present (if fastdepth regime (usually present (if fast-shallow is Regime deep, slow-shallow, fastmissing, score lower than shallow or slow-shallow slow-deep). Parameters to be deep, fast-shallow). if missing other regimes). are missing, score low). (Slow is < 0.3 m/s, deep is Slow-shallow > 0.5 m.) SCORE Little or no enlargement Some new increase in bar Moderate deposition of Heavy deposits of fine 4. Sediment of islands or point bars formation, mostly from new gravel, sand or fine material, increased bar Deposition gravel, sand or fine and less than 5% of the sediment on old and new development; more than bottom affected by sediment; 5-30% of the bars; 30-50% of the 50% of the bottom sediment deposition. bottom affected; slight bottom affected; sediment changing frequently; deposition in pools. deposits at obstructions, pools almost absent due to constrictions, and bends; substantial sediment moderate deposition of deposition. pools prevalent SCORE Water reaches base of Water fills >75% of the Water fills 25-75% of the Very little water in both lower banks, and 5. Channel Flow available channel; or available channel, and/or channel and mostly Status minimal amount of <25% of channel riffle substrates are mostly present as standing pools. channel substrate is substrate is exposed. exposed. exposed SCORE

* - change from low gradient

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important. SCORE Bank Stability (score each bank) Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. Moderately stable; over. 5-30% of bank in reach has areas of erosion, placement of boulders or other large, natural obstruction is important. Moderately unstable; 30-60% of bank in reach has areas of erosion, high erosion potential during floods. Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has	Jery low
Alteration dredging absent or minimal; stream with normal pattern. present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present. SCORE Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream (7:1) (generally 5 to 7); variety of habitat is key. In streams where present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, usually in areas of bridge abutments; evidence of shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted. SCORE Occurrence of riffles relatively frequent; ratio of distance between riffles divided by the width of the stream is between riffles divided by the width of the stream is between 15 to 25. Occurrence of riffles divided by the width of the stream is between 15 to 25.	Jery low
Occurrence of niffles relatively frequent; ratio of divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where Occurrence of niffles infrequent; distance of distance between riffles divided by the width of the stream is between 15 to 25. Occasional niffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25. Occasional niffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Jery low
7. Frequency of Riffles (or bends) Riffles (divided by the width of the stream is between 15 to 25. Riffles (or bends) Riffles (or bends) Riffles (istance between riffles divided by the width of the stream is between 15 to 25.	very low
SCORE Bank Stability (score each bank) Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. Moderately stable; of erosion, small areas of erosion, affected. Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has	em; poor
Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected. Banks stable; evidence of erosion mostly healed over. 5-30% of bank in reach has areas of erosion, bigh erosion potential during floods. Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods. Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has	
facing downstream SCORE (LB) Extrangle 0	*
vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining. patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining. vegetation, including trees, understory shrubs, or nonwoody experitation to vegetation has been removed to 5 centimeters or less in average stubble height.	
SCORE (LB) FIGURE 100	
SCORE (RB) Width of riparian zone 10. Riparian Vegetative Zone Width (score each bank riparian zone) bank riparian zone) SCORE (LB) Width of riparian zone 12-18 meters; human activities fi.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone. SCORE (LB) Width of riparian zone 6- 12 meters; human activities have impacted zone only minimally. Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal. Width of riparian zone 6- 12 meters; human activities have impacted zone a great deal.	
SCORE (RB) RIGIDAL OF THE RESERVE AND A SECOND OF THE RESE	

Total Score 10 (3 parameters)


